

WHAT IS CLAIMED:

1. An armor system for protecting a body, comprising:

at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of protective material, and

a securing layer bonded to at least one of the front side or the backside of the outer case for attaching the armor unit to the body to be protected.

2. The armor system of claim 1, wherein the securing layer comprises an adhesive layer includes a pressure sensitive adhesive and a removable release liner that exposes the pressure sensitive adhesive when the release liner is removed.

3. The armor system of claim 1, further including a securing layer bonded to the front side of the outer case and the backside of the outer case.

4. The armor system of claim 3, wherein the securing layer comprises an adhesive layer includes a pressure sensitive adhesive and a removable release liner that exposes the pressure sensitive adhesive when the release liner is removed.

5. The armor system of claim 1, wherein the outer case includes layers of protective material that includes at least one initial impact layer, at least one layer of steel mesh, and at least one energy-absorbing material layer.

5 6. The armor system of claim 5, wherein the initial impact layer includes at least one layer of woven glass or plastic fibers.

7. The armor system of claim 6, wherein the woven glass or plastic fibers is one of Spectra™, Kevlar™, or Dyneema™.

10 8. The armor system of claim 5, wherein the at least one energy absorbing material layer includes ceramic material.

15 9. The armor system of claim 8, wherein the ceramic material includes ceramic tiles.

10. The armor system of claim 9, wherein the ceramic tiles are perforated with a plurality of holes.

20 11. The armor system of claim 5, wherein the at least one energy absorbing material layer includes loose discrete elements randomly located in the outer case.

12. The armor system of claim 11, wherein the loose discrete elements include ceramic balls.

13. The armor system of claim 1, wherein the armor unit includes a self-healing  
5 layer to fill a void formed by a projectile.

14. The armor system of claim 13, further including at least one layer of ceramic material and at least one layer of tensioned spring material.

10 15. The armor system of claim 13, wherein the self-healing layer includes an agent that expands and hardens when exposed to air.

16. The armor system of claim 15, wherein the self-healing layer includes packets filled with foam that expands and hardens when exposed to air.

15 17. The armor system of claim 10, wherein the at least one energy absorbing material layer includes plural bags of loose discrete elements.

18. The armor system of claim 17, wherein the loose discrete elements include  
20 ceramic balls.

19. The armor system of claim 13, further including a layer of ceramic material and at least one layer of glass or plastic composite material.

20. The armor system of claim 19, wherein the at least one layer of woven glass or plastic fibers is one of Spectra™, Kevlar™, or Dyneema™.

21. The armor system of claim 19, wherein the layer of ceramic material includes at least one layer of ceramic tile and further including a tensioned energy layer.

22. The armor system of claim 21, wherein the at least one layer of ceramic tile includes at least one of hexagonal tiles, square tiles, rectangular tiles, and perforated tiles with plural holes formed therein.

23. The armor system of claim 21, wherein the tensioned energy layer includes tubes of glass or plastic including plural ceramic balls under compression by at least one spring.

24. The armor system of claim 23, wherein each tube includes a spring located at each end of the tube to apply a compression force to the ceramic balls.

25. The armor system of claim 21, wherein the tensioned energy layer includes at least one glass or plastic tube including plural ceramic balls and an end cap located at each end of the tube to release energy upon impact.

5 26. The armor system of claim 21, wherein the tensioned energy layer includes at least one glass or plastic tube including plural ceramic balls, springs located at each end thereof, and an end cap located at each end of the tube to release energy upon impact.

27. The armor system of claim 1, further including a high strength woven  
10 adhesive tape applied to at least one side of the at least one layer of protective material.

28. The armor system of claim 1, further including a high strength woven adhesive tape applied to both sides of the at least one layer of protective material.

15 29. The armor system of claim 1, wherein one layer of protective material includes a layer of ceramic material with a high strength metal bonded thereto.

30. The armor system of claim 1, wherein one layer of protective material includes a layer of perforated ceramic tiles with holes formed therein.

31. The armor system of claim 31, further including a polymer material filling the holes in the ceramic tile.

32. An armor system for protecting a body, comprising:

5 at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of self-healing material to fill a void formed by a projectile, and

an adhesive layer bonded to at least one of the front side or the backside of the outer case for adhering the armor unit to the body to be protected.

10 33. The armor system of claim 32, wherein the self-healing material includes packets filled with an agent that expands and hardens when exposed to air.

34. The armor system of claim 33, wherein the agent is foam.

15 35. An armor system for protecting a body, comprising:

at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of perforated ceramic tiles having holes formed therein, and

20 an adhesive layer bonded to at least one of the front side or the backside of the outer case for adhering the armor unit to the body to be protected.

36. An armor system for protecting a body, comprising:

at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of protective material with a high strength woven tape applied to at least one side thereof, and

5 an adhesive layer bonded to at least one of the front side or the backside of the outer case for adhering the armor unit to the body to be protected.

37. An armor system for protecting a body, comprising:

10 at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of self-healing material to fill a void formed by a projectile.

38. An armor system for protecting a body, comprising:

15 at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of perforated ceramic tiles having holes formed therein.

39. An armor system for protecting a body, comprising:

20 at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of protective material with a high strength woven tape applied to at least one side thereof.

40. The armor system of claim 1, wherein the outer case is made of one of Kevlar® and Dyneema®.

41. An armor system for protecting a vehicle, comprising:

5 a vehicle having a body to be protected,  
at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of protective material, and  
an adhesive securing layer bonded to at least one of the front side or the backside  
10 of the outer case for attaching the armor unit to the vehicle.

42. An armor system for protecting a body, comprising:

at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one tensioned energy  
15 layer including plural discrete elements under tension that are released upon impact to repopulate a void created by the projectile.



43. A method of protecting a body, comprising:

providing at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of protective material, and

5 providing a securing layer bonded to at least one of the front side or the backside of the outer case for attaching the armor unit to the body to be protected.

44. A method of protecting a body, comprising:

10 providing at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of self-healing material to fill a void formed by a projectile, and

providing an adhesive layer bonded to at least one of the front side or the backside of the outer case for adhering the armor unit to the body to be protected.

15 45. A method of protecting a body, comprising:

providing at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of perforated ceramic tiles having holes formed therein, and

20 providing an adhesive layer bonded to at least one of the front side or the backside of the outer case for adhering the armor unit to the body to be protected.

46. A method of protecting a body, comprising:

protecting at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of protective material with a high strength woven tape applied to at least one side thereof,

5 and

protecting an adhesive layer bonded to at least one of the front side or the backside of the outer case for adhering the armor unit to the body to be protected.

47. A method of protecting a body, comprising:

10 providing at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of self-healing material to fill a void formed by a projectile.

48. A method of protecting a body, comprising:

15 providing at least one armor unit having an outer case with a front side and a backside forming an interior, the interior of the outer case including at least one layer of perforated ceramic tiles having holes formed therein.